The Stone Age of the Digital Arts

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When Tim Binkley of the School of Visual Arts (SVA) contacted Leonardo with the idea of collaborating on the Digital Salon, we quickly accepted the proposal. This issue celebrates the many years of collaboration between SVA and Leonardo, a collaboration that has brought a new generation of digital artists to the attention of the international Leonardo audience. When Leonardo first started publishing the work of pioneering computer artists in the late 1960s [1] it was far from obvious that computer art would become the powerful means for contemporary expression that it has become today. Most new technologies do not prove to be suitable for art-making.

The change in the situation has been dramatic, seen from the point of view of the Leonardo editorial office. Our first book related to the use of computers in art—Visual Art, Mathematics and Computers [2], published in 1979—found a small but receptive audience. At that time, few art schools had programs that addressed the use of computers in art-making and only such visionary centers as Gyorgy Kepes’s Center for Advanced Visual Studies at MIT provided environments where artists could access the latest tools and devices. Our latest book to address the use of computers in art-making is Lev Manovich’s The Language of New Media [3]; it has now appeared in paperback and is reaching a large international audience. All major universities now have or are starting to have new programs in art and technology, or art and new media. There are schools dedicated to the new art forms, such as the Academy of Media Arts in Cologne, Germany. SVA in New York now has one of the leading programs in the field.

In July 2002, Leonardo co-organized a workshop at the Schloss Dagstuhl Center in Germany on the topic of Aesthetic Computing [4]. The workshop was led by a computer scientist, Paul Fishwick [5], and brought together artists, engineers, designers, and computer scientists. There was a new urgency. The discussion did not address how one could produce computer output that was considered to be of artistic or aesthetic interest. Instead, the heart of the debate was whether we could bring new ideas from art theory and contemporary art practice into computer science, engineering, and design—and beyond this, whether we could re-imagine the internal structures and processes, the very metaphors of how computers are designed, made, and used. Some of these are burning issues in computer science and engineering; there is an increasing interest in the personalization of computers to adapt them to individual use and preference. The computer is now a mass market device whose future use and evolution depends in large part on social acceptance and cultural desires.

The computer is still a very primitive device, and its cultural appropriation has barely begun. At an early ISEA conference, William Buxton, then of Xerox PARC, made an impassioned plea for re-imagining what computers could be. He compared the use of a computer keyboard as a human-machine interface with the musician’s use of a trombone or trumpet. A trumpet player uses eyes, ears, breath, saliva, body movement, and touch to such an extent that the trumpet truly becomes a seamless extension of the artist’s will. A jazz ensemble achieves a level of interactive creation that remains unmatched by any computer-mediated system. Even today’s handheld devices are still foreign objects to the body and mind of the user. A number of experimental computer-machine interfaces and immersive environments—many developed by artists—now exist, but none are in large-scale production, nor do they achieve the jazz ensemble’s seamless integration of human and tool in group work. The computer has not yet entered the biological age.

The artists at the Dagstuhl workshop included pioneers in computer art such as Frieder Nake and Ernest Edmonds, but also artists from the more recent generation of practitioners such as Jane Prophet, Christa Sommerer, and Jon McCormack. The early computer artists were either scientists or engineers interested in creating artworks, or artists working in close collaboration with engineers who translated the artists’ ideas into concrete form. Today
there are artists sufficiently well versed in contemporary computer science and engineering that they can carry out their own technical work or, as artists, lead multidisciplinary teams both to create artworks of artistic interest and even to develop innovative engineering and computer-sciences solutions or inventions. We again find ourselves in one of those special times in cultural history when artists, scientists, and engineers—because of their use of the same tool (in this case the computer)—can share experiences and vocabularies, views of what problems might be interesting to solve and of which solutions would be considered exciting. Inevitably, shared epistemologies, aesthetics, and ethical systems will emerge from this process. The conditions are right for the emergence of New Leonardos.

Many of the New Leonardos will not be individuals, but rather teams of several or many individuals working together. The Internet as a working environment facilitates many forms of cooperative, collective, and collaborative work. The problems being tackled often require interdisciplinary teams that bring together disparate expertise from disciplines as diverse, for instance, as the cognitive sciences, nanotechnologies, biological sciences, and cultural theory. Already, the open-source approaches can point to successes in marshalling the creativity of large teams of geographically dispersed individuals on common projects. The institutional frameworks that foster such interdisciplinary work, and that often need to bridge the non-profit/for-profit societal systems, are still in their infancy. A few pioneering programs, such as Roy Ascott’s CAiiA-STAR, are exploring this education and research territory. Unfortunately early programs such as Xerox PARC’s Artist-in-Residence program [6] and Interval Research Corporation are no longer in existence. Leonardo has recently launched a study under the leadership of Michael Naimark, with support from the Rockefeller Foundation, to learn lessons from the last 40 years of institutional experiments, ranging from the early E.A.T. (Experiments in Art and Technology) program to today’s leading institutions, such as ZKM (Zentrum für Kunst und Medientechnologie), Ars Electronica, Banff Centre for the Arts, and ICC (NTT’s InterCommunication Center, Tokyo). The time may be ripe for new forms of hybrid institutions that take advantage of the distributed strategies enabled by the Web.

Irrationally, the very name “Digital Salon” has become an anachronism. The rapid mutation of terminology indicates that the heart of the matter has not yet been identified. The early practitioners of machine art, algorithmic art, electronic art, computer art, digital art, Web art, and new media art [7] have shared few things except the use of the computer itself; their goals and practices differ widely, and they do not share a common aesthetic. In addition, many of the artists in new media also make use of many other technologies that are not computer-based and are only incidentally digital. Steve Wilson, in his Leonardo book Information Arts [8] has documented the growing array of areas in science and technology where artists are now occupying aesthetic territory. These range through all the physical, chemical, cognitive, and biological sciences and include the whole array of nano- to macro-technologies. If the computer-based arts are still in their infancy, these other art forms are still at the point of conception.

And yet this work is not peripheral to the development of the science and technology of the future, but is at the heart of the cultural imagination that creates the very desires motivating children to become tomorrow’s scientists and engineers. Not only does the interaction between artists, scientists, and engineers create the context for improved science and engineering, but different forms of science and engineering will emerge from this period of cross-fertilization. Scientists and engineers now work in realms that are almost totally outside of direct human experience. Astronomers work with forms of energy, such as gravity waves and neutrinos, that are not directly accessible to the human nervous system. Physicists and biologists work on such small scales that quantum effects and group phenomena emerge that are unknown on the scale that humans can experience directly. Chemists can now design materials with properties that are totally foreign to natural systems. Astronauts experience in zero gravity behaviors that are totally new to human sensory and locomotive experience. And, of course, computer scientists and engineers have provided a globally linked Internet system that allows such rapid feedback and diffusion of human interaction that we are entering a space of unknown social phenomena and behaviors. The human cognitive system did not develop with these new extensions of the human nervous system in place, nor while interacting with these environments and phenomena. So how do we develop our intuition about worlds and phenomena that are physically impossible for our human senses to experience directly? How do we build systems of values and systems of meanings, of ethics and aesthetics in this new epistemological landscape? Ken Goldberg, in his Leonardo book The Robot in the Garden [9], elaborates upon these issues in his exploration of “teleepistemology”; the crucial question is no longer the location of the “ghost in the machine,” but whether humans as primitive robots in this new foreign landscape can find a new orientation and vision for the human condition.

This new intuition can be built and cultural appropriation can occur if we create situations in which contemporary science and technology can be incorporated into artistic exploration (and vice versa), while recognizing the very different disciplines of the arts, the sciences, and engineering. The creative process may be similar, but methodologies, goals, success criteria, and institutional contexts are very different, and no doubt many areas of art, science, and technology interaction will prove to be culturally sterile. The steam engine, railroad, and telephone may have transformed the social landscape, but no significant new art forms have emerged out of these particular technologies. Technologies of the moving image and cinema led to the media society we now enjoy, but there is no way of knowing ahead of time whether the new biologies and genetic engineering will lead to crucial art forms of the future until artists get inside them and make stories, tinker with the systems, and re-engineer their context.
We are in the Stone Age of the digital arts, and it is likely that the future of the digital arts will have little to do with the digital and everything to do with the aesthetic and ethics that emerge from the new situation, just as the Renaissance was not about the technology of perspective but more about the new vision that emerged of the place of humans in nature and the future of human society. The New Leonar- dos face a task as daunting as the tasks confronting Leonardo da Vinci and his peers; we can only hope that this special period of interaction between artists, scientists, and engineers will change our vision of the world and our place in it as profoundly as the Renaissance did. The artists of the Digital Salon are among those laying the groundwork for this cultural transforma-

REFERENCES


4. See the seminar description at <http://www.dagstuhl.de/02291/>.


7. See, for example, the New Media Dictionary project, <http://www.comm.uqam.ca/GRAM/Accueil.html> (in French).


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